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(18-22 by 8-10 μ). We have designated this as var. *simplex*, E. & E. Specimens found by Col. W. W. Calkins near Jacksonville, Fla., January, 1889, have the 3 septate (24-30 by 10-12 μ) sporidia of the Carolina and Louisiana specimens, but the hymenium is slate color, the perithecia cespitose (they are scattered in all the others), and the lips very distinctly striate. We have called this var. *fuscum*, E. & E.

BRIEF NOTES ON A FEW COMMON FUNGI OF MONTANA.

By W. F. ANDERSON.

CLAVICEPS PURPUREA, said to be comparatively rare in many Eastern States, is found everywhere in the Territory. I have found it on four species of *Elymus*, on three species of *Poa*, on six species of *Agropyrum* as well as on *Kæleria cristata*, *Phalaris arundinacea*, and several other grasses. The little rye grown is not materially injured by the *Claviceps*. I have collected this fungus at 8,000 feet altitude; it is as common at that height as at 3,000 feet—the general average of Montana's plains above sea level.

Some years the loss to stock-men from the abortions of cows and mares is heavy. Many claim that losses from this cause are greater in seasons when an unusual abundance of ergot is developed on the grasses; but there are others who scout this idea. However, whether the eating of ergot in considerable quantity by stock has an irritating influence on the internal genitals or no, it is certain that the general health of the animals is impaired thereby.

USTILAGO CARICIS is remarkably plentiful, pretty regularly every other year. Whether it is a baneful fungus to the health of stock I am not prepared to say. It is at any rate seriously injurious to three small but important forage plants, viz: *Carex filifolia*, *Carex stenophylla*, and *Carex Douglasii*. These sedges, especially the first, comprise a considerable proportion of the "grass" on the plains, and are eagerly eaten by stock. In April they are in flower and by the 1st of May their fruit is more or less fully developed. Diseased spikes are very conspicuous in the immature stage of the fungus by the round lead-colored balls attached to them. Later this lead-colored coat breaks, and the intensely black spores are seen to cover the balls. Stock avoid plants in this condition.

USTILAGO SEGETUM as yet is not seriously injurious to cultivated cereals. It is rather common, however, on the weed *Hordeum jubatum*.

USTILAGO MINIMA is common on *Stipa comata*. It destroys the panicle almost entirely. In autumn the bare blackened rachis breaks out of the sheath and curves outward and downward, almost touching the ground.

Another *Ustilago* which bids fair to do considerable damage to *Muhlenbergia* as soon as that grass is cultivated as a regular crop is the new

Ustilago Montaniensis Ellis & Holway, on *Muhlenbergia glomerata* var. *setiformis*, first discovered by the writer December 12, 1887. This appears to be one of the most destructive species of *Ustilago* we have. The host plant begins to "head out" when it is 3 inches high. These early panicles are lateral, and smaller than the final terminal panicle, which, under favorable conditions, is developed by the time the plant is 24 or 30 inches high. Culms affected by the fungus are generally stunted and thickened, becoming harsh and knotty. Their panicles are usually aborted from first to last. Sometimes only the lower or middle spikelets in the dense spikes are infected, the rest being perfect and producing seed. In the case of the small lateral panicles, which are mostly smutted entirely, the panicles do not grow out of the sheaths, but are inclosed by the united and membranous bases of the sheathing leaves. As the fungus develops this usually cylindrical or oblong sac enlarges and gradually loses its leaf character, except where its two parts extend above and beyond the inclosed panicle. The membrane surrounding the smut has by this time become a leaden-gray color, and exceedingly thin and chartaceous. Where only more or less isolated small spikes and spikelets of a panicle are affected, the surrounding membrane is formed by the uniting of the glumes, which are free and maintain their true character only at their tips.

Three times out of five if the fungus is present it affects all the panicles. When the very first one appears in an infected plant it will be found full of smut, and each succeeding panicle as it is developed will be found to be in a similar condition, so that it is evident the fungus develops with the host. The host is a perennial, and so far as I have been able to discover by examining old and new culms, representing four years' growth, the plant once attacked is affected each succeeding year until its death. As *Muhlenbergia* is a valuable grass and will soon be common in cultivation, this fungus ought to receive careful attention.

ERYSIPHE GRAMINIS is a common pest in some sections, notably in southern Montana, west of the main divide of the Rocky Mountains. It affects chiefly the *Poas* and is especially damaging to *Poa tenuifolia*, one of our most valued forage grasses. The asci of the fungus contain ripe spores in November.

PUCCINIA RUBIGO-VERA is common everywhere. I have collected it on fourteen species of native grasses. It is most damaging to *Elymus condensatus*. Wheat and oats do not suffer from it as yet.

PUCCINIA TANACETI occurs on many hosts. The cultivated Sunflower is sometimes ruined by this fungus. The common Sage-brush (*Artemisia tridentata*) is frequently attacked so overwhelmingly by *Puccinia tanaceti* that its flowers dry up and its leaves fall off. The fungus attacks the younger stems and shoots, blackening them also. I have found it on five species of *Artemisia*, viz: *A. tridentata*, *A. cana*, *A. Ludoviciana*, *A. frigida*, and *A. dracunculoides*. On *A. dracunculoides* and *A. Ludoviciana* I have found one of the numerous *Æcidium* com-

positarum forms occurring with the uredo of *Puccinia tanaceti*, closely followed by the teleutospores. The same *Aecidium* occurs on all five, and is invariably followed, if not accompanied, by the uredo and teleutospores of this fungus.

PHRAGMIDIUM SUBCORTICUM occurs, sometimes to an alarming extent, on *Rosa Arkansana*, *Rosa blanda* (?), and *Rosa Sayi*. No doubt it would do serious damage to cultivated roses in certain localities. At Helena in 1887 I found several cultivated varieties more or less affected by the *aecidium* of this fungus. On the wild roses the uredo and teleutospores do serious injury, some years destroying the leaves.

MELAMPSORA SALICIS is found on nearly all our Willows. I have found it abundantly on *Salix longifolia*, *S. cordata*, *S. amygdaloidea*, *S. rostrata*, *S. flavescentia*, and *S. glauca*. It appears to be most injurious to *Salix cordata* and *Salix flavescentia*. Sometimes in the early fall great clouds of the red uredospores are blown from the trees, sprinkling the vegetation for some distance around. Last year this *Melampsora* was unusually prevalent and vigorous in its attacks. I found it both sides of the main divide of the Rocky Mountains, from the southern border of the Territory and the source of Clarke's Fork of the Columbia River and the source of the Missouri River, thence northeastward to within fifty miles of the Canadian line. Good sized trees in some localities were almost entirely defoliated. On the banks of the Upper Missouri, in one locality, were found in September several hundred acres of seedlings of *Salix amygdaloidea* and *Salix cordata*, then from 3 to 6 inches high and as close as grass, which were probably permanently ruined by the uredo of *Melampsora salicis*. The leaves, especially the lower ones, had all fallen from the effect of the parasite and were decaying. The upper leaves were almost devoid of chlorophyll and evidently perishing.

MELAMPSORA POPULINA, like the last, was very abundant last year and did considerable damage to *Populus tremuloides* and *P. angustifolia*. I also found it on *P. monilifera*, *P. balsamifera*, and *P. angulata* more sparingly.

MELAMPSORA LINI some seasons is ruinous to *Linum rigidum*, and also sharply attacks *Linum Lewisii* (commonly called *L. perenne* by western collectors). *Linum Lewisii* is rather similar to the cultivated flax, and if the latter were introduced it would doubtless suffer more or less from this fungus.

SPOTTING OF PEACHES.

By ERWIN F. SMITH.

A recent paper on this subject by Dr. J. C. Arthur (Bull. Agr. Exp. Sta., Indiana, No. 19, 1889) leads to the following remarks:

Cladosporium carpophilum, v. Thümen is undoubtedly the conidial stage of some well-known ascomycetous fungus. It occurs on the leaves